

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
3 January 2002 (03.01.2002)

PCT

(10) International Publication Number
WO 02/01060 A1

(51) International Patent Classification⁷: F02M 35/024

(81) Designated States (*national*): AU, BR, CA, CN, JP, KR, RU, SG, US.

(21) International Application Number: PCT/TB00/00852

(22) International Filing Date: 26 June 2000 (26.06.2000)

(84) Designated States (regional): European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

(25) Filing Language: English

Published:

(26) Publication Language: English

---- with international search report
 ---- with amended claims

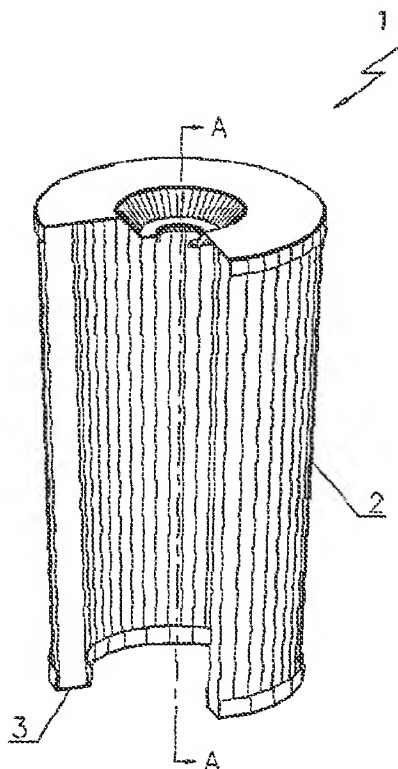
(71) Applicant and

(72) Inventor: WIJAYA, Heru, Prasanta [ID/ID]; Graha Famili D.183, PR. Kali Kendal, Surabaya 60226 (ID).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(74) Agent: PRIAPANTJA, Cita, Citrawinda; Biro Oktroi Roosseno, Kantor Taman A9, Unit C1-C2, Jl. Mega Kuningan, Kuningan, Jakarta 12950 (ID).

(54) Title: INTERSECTED CONE-SHAPED AIR FILTER FOR AN AUTOMOTIVE INTERNAL COMBUSTION ENGINE



(57) Abstract: This invention relates to an intersected cone-shaped air filter (1) for focusing air flow within an automotive internal combustion engine which substantially comprises a hollow body (2) of specified thickness whose side dips 2° to 7° with respect to vertical axis, and a clamping ring (3) which is fixedly disposed along the outer periphery of the upper and the lower ends of the filter body (2) for strengthening the filter body construction. The air filter body is made up of symmetric longitudinally folded filter paper materials whose thickness governs that of the air filter body (2).

WO 2016/02069 A1

Description

INTERSECTED CONE-SHAPED AIR FILTER FOR AN AUTOMOTIVE
5 INTERNAL COMBUSTION ENGINE

Technical Field of Invention

This invention relates to an air filter, particularly
10 an intersected cone-shaped air filter that can focus airflow
into an automotive internal combustion engine.

Background of Invention

15 Current automotive technology needs automotive engines
of high performance. A highly performed automotive engine
requires that fuel must be proportionately mixed with clean
air and the mixture produced can quickly reach the internal
combustion charge.

20 There are two options for the accomplishment of the
conditions cited above. The first is to minimize fluid
friction, and the second one is to exert a driving force on
the mixture. It can be performed only by designing
appropriately the aerodynamic construction of the air
25 filter.

The object of this invention is thus to provide an air
filter wherein a driving force is performed due to the
focusing of the airflow on the midmost streamline. Based on
its shape, i.e., intersected cone, the air filter is
30 referred to CYCLO FILTER.

Brief Description of the Invention

This intersected cone-shaped air filter is designed for
35 the purpose of filtering the air flowing into an automotive
internal combustion engine and focusing it to the midmost
streamline. Due to its intersected conical shape, the
effective area of this air filter's cylindrical surface is

advantageously larger than that of previously adapted filters.

The larger the effective area of this air filter's cylindrical surface is, the more the mass of the air-fuel mixture that will flow into the combustion chamber. And the driving force resulted in due to the focusing of air flow on the midmost streamline will increase the velocity and the mass of the air-fuel mixture within the combustion chamber. Consequently, it will be generated by the automotive engine.

10

Brief Description of the Drawing

Figure 1a is a perspective view of the air filter presently invented with body being partially opened.

15

Figure 1b is a longitudinal cross section along line A-A of the embodiment in shown in Figure 1a.

Figure 2a is a perspective view of the modification of the air filter presently invented with body being partially opened.

20

Figure 2b is a longitudinal cross section along line A'-A' of the embodiment in shown in Figure 2a.

Figure 3 is a schematic diagram showing the path of the airflow from the atmosphere into an automotive internal combustion engine.

25

Detailed Description of the Invention

Figure 1a and 1b show a basic construction of an intersected cone-shaped air filter (1) comprising a hollow body (2) of specified thickness the side of which dips downwardly 2° to 7° with respect to vertical axis. The filter body is made up of symmetric longitudinally folded filter paper materials whose thickness governs the thickness of the air filter body (2).

35

A clamping ring (3) is fixedly disposed along the outer periphery of the upper and the lower ends of the filter body (2) for strengthening the filter body construction.

Figure 2a and 2b show the one of the modifications of the cone-shaped air filter, which have specifics hollow body (2'). The outer wall body of the air filter shape is cylindrical and the inner wall body of the air filter shape is intersected cone.

Figure 3 is a schematic diagram showing the path of the air flow from the atmosphere into an automotive internal combustion engine. Air from the atmosphere is directed to an air filter (I) through the air filter body. Owing to the shape of the filter, the air flows through the centre of the smaller end of the filter into the mixing chamber (II). The air and fuel which have become air-fuel mixture after entering the mixing chamber, flows further into the combustion engine (III). The driving force resulted in due to the focusing of the airflow on the centre of the smaller end of the filter will increase the velocity and the mass of the air-fuel mixture within the combustion chamber.

The preferred embodiments described within this specification are intended only for illustration, not to limit the scope of invention. Modification of any kind is always possible for them skilled in the art as long as it is still within the scope of invention and claim.

Claim

1. An intersected cone-shaped air filter (1) for focusing
air flow within an automotive internal combustion
engine which comprises:
5 a hollow body (2) of specified thickness whose
side dips 2° to 7° with respect to vertical axis and
is made up of symmetric longitudinally folded filter
paper material whose thickness governs the thickness
10 of the air filter body (2),
a clamping ring (3) which is fixedly disposed
along the outer periphery of the upper and the lower
ends of the filter body (2) for strengthening the
filter body construction.
15
2. An intersected cone-shaped air filter that have a
hollow body (2') whose outer wall of the air filter
body shape is cylindrical and the inner wall of the
air filter body is intersected cone.
20
3. An intersected cone-shaped air filter, which has a
hollow body shape as described on claims 1 and 2, made
of the porous material.

AMENDED CLAIMS

[received by the International Bureau on 03 May 2001 (03.05.01);
original claims 1-3 replaced by amended claims 1-4 (1 page)]

1. An intersected cone-shaped air filter (1) for focusing air
flow within an automotive internal combustion engine which
comprises:
a hollow body (2) of specified thickness whose side
dips 2° to 7° with respect to vertical axis and is made up
of symmetric longitudinally folded filter paper material
whose thickness governs the thickness of the air filter body
(2),
a clamping ring (3) which is fixedly disposed along
the outer periphery of the upper and the lower ends of the
filter body (2) for strengthening the filter body
construction; and the way out of clean air is on the top of
intersected cone.
2. An intersected cone-shaped air filter according to claim 1
that has a hollow body (2') whose outer wall of the air
filter body shape is cylindrical and the inner wall of the
air filter body is intersected cone.
3. An intersected cone-shaped air filter, which has a hollow
body shape as described on claims 1 and 2, made of the
porous material.
4. An intersected cone-shaped air filter according to claim 1
for producing driving force that increases the velocity and
the mass of the air- fuel mixture.

1/3

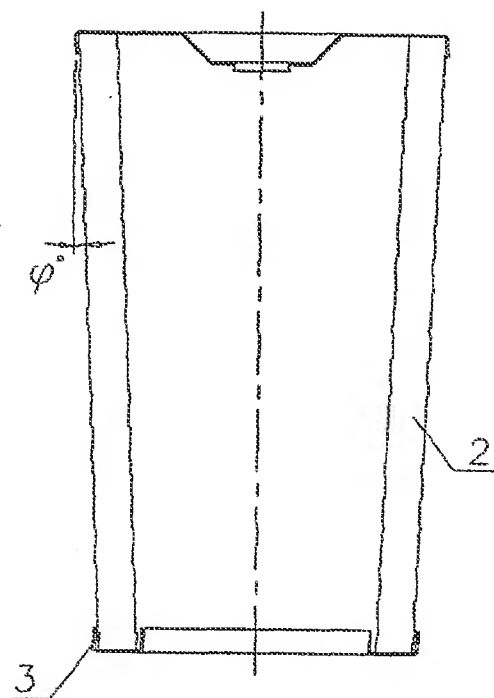
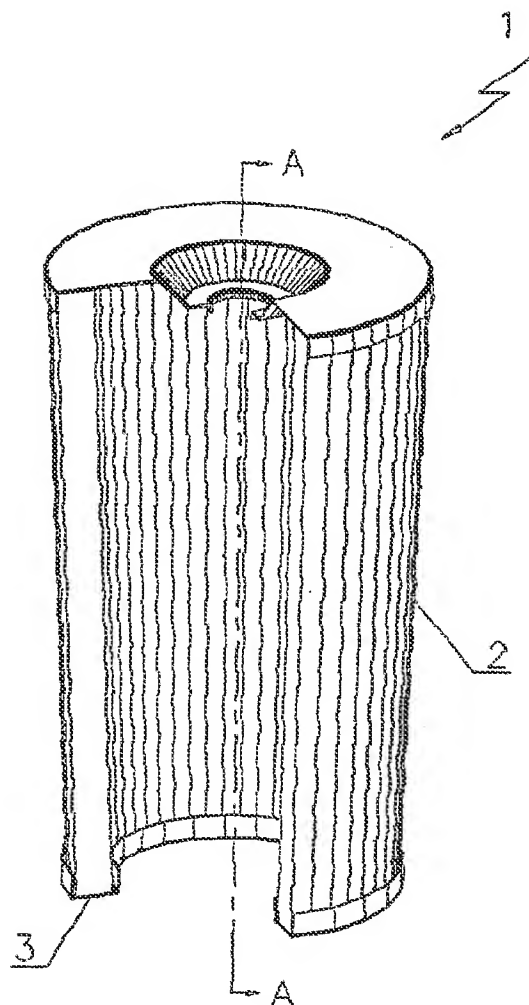


Figure 1a

Figure 1b

2/3

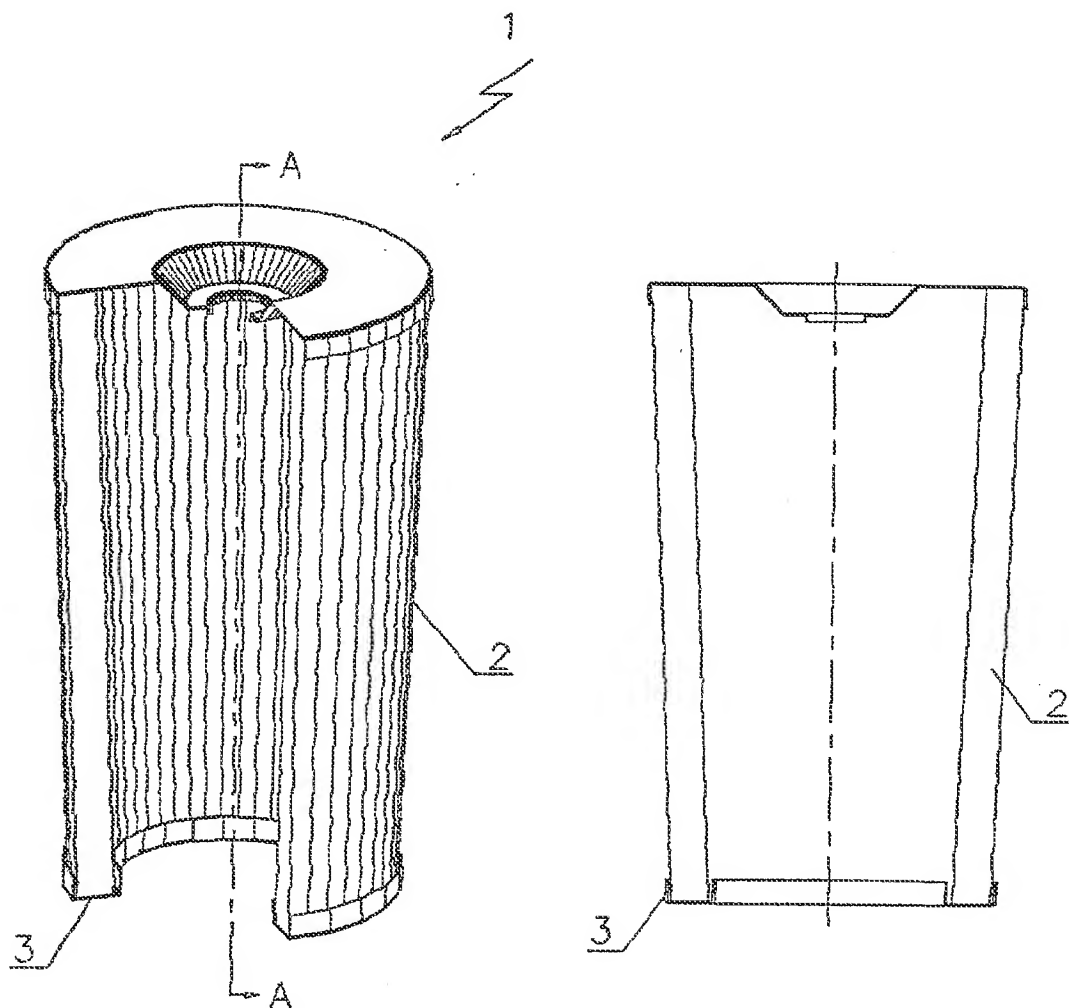


Figure 2a

Figure 2b

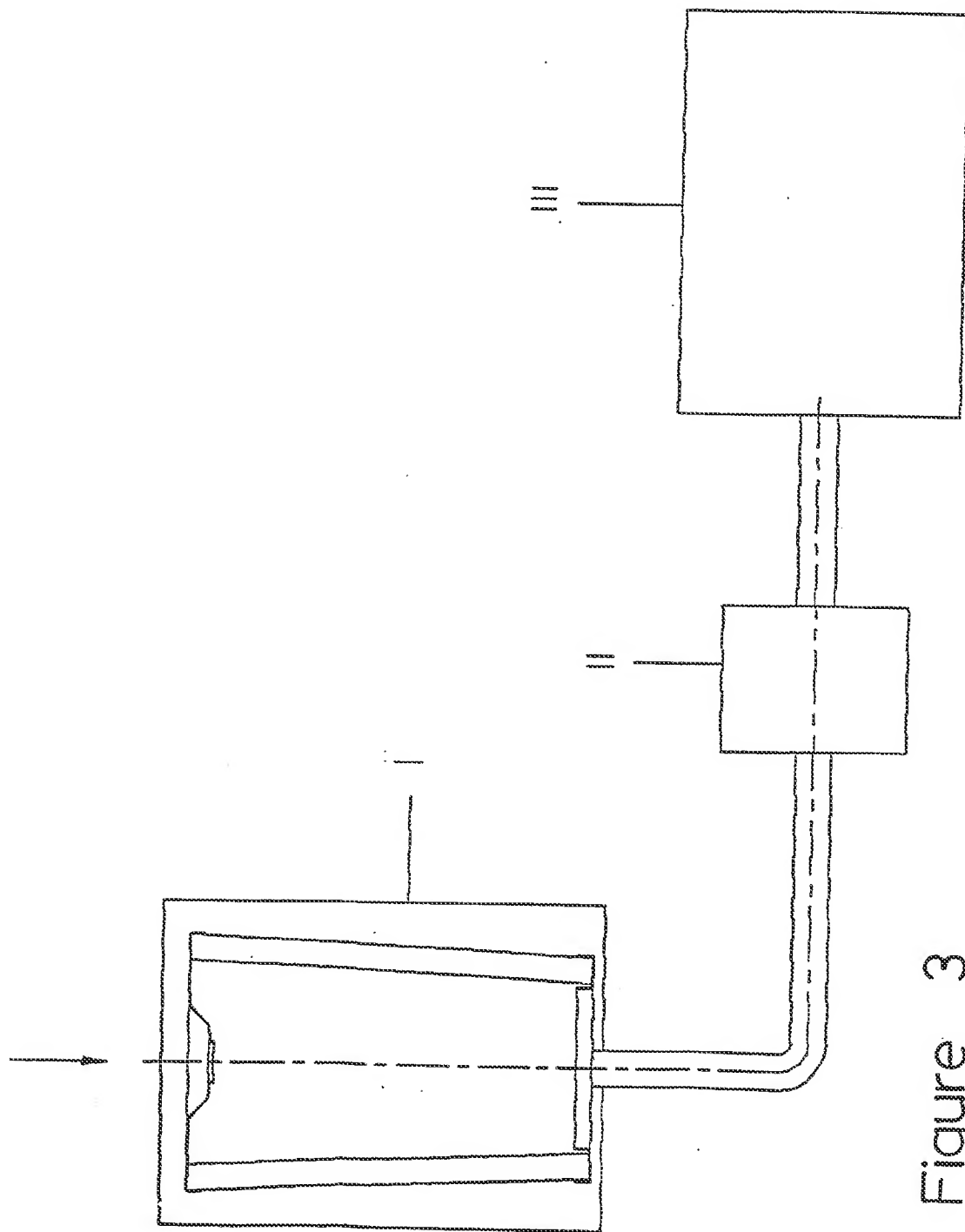


Figure 3

INTERNATIONAL SEARCH REPORT

 International Application No
 PCT/IB 00/00852

 A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 F02M35/024

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

 Minimum documentation searched (classification system followed by classification symbols)
 IPC 7 F02M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 498 915 A (WITCHELL) 12 February 1985 (1985-02-12) abstract column 4, line 20 - line 35	1,3
X	WO 00 25894 A (DONALDSON) 11 May 2000 (2000-05-11) page 8, line 21 -page 9, line 5; figure 5	1,3
A	FR 2 214 505 A (C.F.E.A.) 19 August 1974 (1974-08-19) page 3, line 23 - line 35 page 4, line 26 - line 30; figures 1,5	1,3
A	DE 18 01 161 A (PUROLATOR) 16 April 1970 (1970-04-16) page 9, line 26 - line 36; figure 3	1,3
	-/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *Z* document member of the same patent family

Date of the actual completion of the international search

21 February 2001

Date of mailing of the international search report

27/02/2001

 Name and mailing address of the ISA
 European Patent Office, P.B. 5310 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

Joris, J

INTERNATIONAL SEARCH REPORT

In International Application No
PCT/IB 00/00852

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 2 075 364 A (PRÉCISION MÉCANIQUE LABINAL) 18 November 1981 (1981-11-18) page 2, line 24 - line 33 page 3, line 1 - line 8; figure 11 -----	1,3
A	GB 456 468 A (ALEXANDER) page 2, line 72 - line 79; figure 1 -----	1

INTERNATIONAL SEARCH REPORT
Information on patent family members

International Application No
PCT/IB 00/00852

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4498915 A	12-02-1985	GB 1507824 A	19-04-1978
		AU 497890 B	18-01-1979
		AU 7953575 A	30-09-1976
		BE 900150 A	05-11-1984
		DE 2513426 A	02-10-1975
		FR 2265436 A	24-10-1975
		JP 1239898 C	13-11-1984
		JP 50134265 A	24-10-1975
		JP 59012327 B	22-03-1984
		SE 415635 B	20-10-1980
		SE 7503362 A	30-09-1975
		US 4200444 A	29-04-1980
		ZA 7501732 A	25-02-1976
WO 0025894 A	11-05-2000	US 6152979 A	28-11-2000
		AU 1208400 A	22-05-2000
FR 2214505 A	19-08-1974	NONE	
DE 1801161 A	16-04-1970	NONE	
GB 2075364 A	18-11-1981	FR 2484274 A	18-12-1981
		DE 3117625 A	13-05-1982
		IT 1138340 B	17-09-1986
GB 456468 A		NONE	